

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A process for producing two families of biofuels from at least one triglyceride, formed between at least one fatty acid and glycerol, characterized in that it comprises:

a reaction I of at least one transesterification step in which said triglyceride is reacted by heterogeneous catalysis with at least one primary monoalcohol selected from methanol and ethanol to produce a mixture of at least one methyl and/or ethyl ester of the fatty acids of the starting triglyceride(s) as the first biofuels biofuel, and glycerol, separating heterogeneous catalyst from said mixture

separating the crude glycerol from resultant mixture and subjecting the crude glycerol to a purification step consisting of a vacuum treatment to remove said at least one primary monoalcohol-said products being free of by-products; and

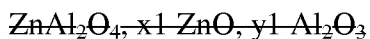
an etherification step in which the resultant crude vacuum treated glycerol from the transesterification step is reacted directly (i.e. without prior chemical treatment) directly with at least one olefinic hydrocarbon containing 4 to 12 carbon atoms to obtain at least one glycerol acetal as the second biofuels biofuel; and/or

an acetalization step in which the crude vacuum treated glycerol from the transesterification step is reacted directly, without prior chemical or purification treatment, with at least one compound selected from aldehydes, ketones and acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal as the second biofuel, and directly adding the resultant etherified and/or acetalized crude vacuum treated glycerol to a fuel comprising all of said first biofuel.

2-4. (Cancelled)

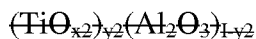
5. (Currently Amended) A process according to claim 2 21, characterized in that said catalyst comprises:

~~a mixture of zinc oxide and alumina or a zinc aluminate, for example of the spinel type, having the following formula:~~



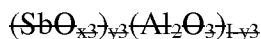
~~x1 and y1 each being in the range 0–2;~~

~~titanium oxide or a mixture of titanium oxide and alumina having the following formula:~~



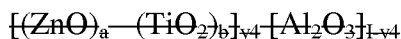
~~x2 having a value of 1.5 to 2.2 and y2, representing the weight ratio of the two oxides, having a value of 0.0005 to 1;~~

~~a mixture of antimony oxide and alumina having the following formula:~~



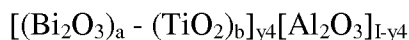
~~x3 having a value of 1.2 to 2.6 and y3, representing the weight ratio of the two oxides, having a value of 0.005 to 0/995;~~

~~a mixture of zinc oxides and titanium or a mixture of zinc oxide, titanium oxide and alumina having the following formula:~~



~~a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.0005 to 1; or~~

~~a mixture of oxides of bismuth and titanium or a mixture of bismuth oxide, titanium oxide and alumina having the following formula:~~



~~a having a value in the range 0.5 to 5, b having a value in the range 0.5 to 5 and y4 having a value of 0.005 to 1.~~

6-8. (Cancelled)

9. (Currently Amended) A process according to claim 8 1, characterized in that: vegetable oil and methanol are introduced as continuously upflow into a fixed bed

catalytic transesterification reactor preheated to a temperature which ~~may be~~ in the range of 170° to 250°C 210°C at an operating temperature in the range 3 to 6 MPa, with an HSV (volume of oil/volume of catalyst/hour) of 0.3/1 to 3/1 and an alcohol/oil weight ratio of 2/1 to 0.1/1; and at the reactor outlet, depressurizing to at least partially eliminate the excess methanol and the glycerol formed is eliminated by simple static decantation; the conversion of the methyl esters obtained being in the range 85% to 97%.

10. (Currently Amended) A process ~~according claim 9, for producing two families of biofuels from at least one triglyceride, formed between at least one fatty acid and glycerol, characterized in that it comprises:~~

a reaction I of at least one transesterification step in which said triglyceride is reacted by heterogeneous catalysis with at least one primary monoalcohol selected from methanol and ethanol to produce a mixture of at least one methyl and/or ethyl ester of the fatty acids of the starting triglyceride(s) as first biofuel, and glycerol, separating heterogeneous catalyst from said mixture

separating the crude glycerol from resultant mixture and subjecting the crude glycerol to a purification step consisting of a vacuum treatment to remove said at least one primary monoalcohol; and

an etherification step in which the resultant crude vacuum treated glycerol from the transesterification step is reacted directly with at least one olefinic hydrocarbon containing 4 to 12 carbon atoms to obtain at least one glycerol acetal as the second biofuel; and/or

an acetalization step in which the crude vacuum treated glycerol from the transesterification step is reacted directly with at least one compound selected from aldehydes, ketones and acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal as the second biofuel,

and directly adding the resultant etherified and/or acetalized crude vacuum treated glycerol to a fuel comprising all of said first biofuel characterized in that the reaction I is continued in a second catalysis step in a second reactor having an inlet and an outlet carried out under the same operating conditions as in the first catalysis step, to achieve a methyl ester

conversion of 97.5% to 99.5%, and at the outlet of the second reactor, excess methanol is removed by distillation to completely free the methyl ester of methanol.

11. (Currently Amended) A process according to claim 1, ~~characterized in that~~ the etherification step is ~~carried out~~ conducted between the glycerol from the transesterification step and isobutene, in the presence of an acid catalyst.

12-14. (Cancelled)

15. (Currently Amended) A process according to claim 1, characterized in that the acetalization step is carried out between the glycerol obtained from the transesterification step directly without neutralization or washing steps and an aldehyde, a ketone or an acetal derived from said aldehyde or said ketone in the presence of an acid catalyst.

16. (Currently Amended) A process ~~for preparing a fuel, characterized in that it comprises:~~
~~at least one transesterification step in which said triglyceride is reacted by heterogeneous catalysis with at least one primary monoalcohol selected from methanol and ethanol to produce at least one methyl and/or ethyl ester of the fatty acids of the starting triglyceride(s) as the first biofuels, and glycerol, said products being free of by-products; and~~ according to claim 1, comprising

an acetalization step in which the glycerol from the transesterification step is reacted directly, without prior ~~chemical treatment~~ neutralization or washing treatments, with at least one compound selected from aldehydes, ketones an acetals derived from aldehydes or ketones, to obtain at least one glycerol acetal; and

incorporating the glycerol acetal obtained into a fuel.

17. (Original) A process according to claim 16, characterized in that said fuel is a gas oil, a biodiesel or a gasoline.

18. (Currently Amended) A process according to claim 17, characterized in that said fuel further comprises the methyl and/or ethyl ester of fatty acids of starting triglyceride.

19. (Currently Amended) A process according to claim ~~1~~ 16, wherein said at least one triglyceride is rapeseed oil ~~or sunflower oil~~ and wherein the glycerol is acetalized with acetone to form 2,2-dimethyl-1,3-dioxolane-4-methanol.

20. (Cancelled)

21. (New) A process according to claim 16, wherein said at least one triglyceride is rapeseed oil wherein the glycerol is etherified with isobutene and the monoalcohol is methanol.